IN THE CLAIMS

1. (Currently Amended) A wavelength-tunable laser apparatus comprising:

a semiconductor substrate;

a Fabry-Perot laser formed on the semiconductor substrate, the laser having a plurality of longitudinal modes; and

a planar lightwave circuit formed on the semiconductor substrate, the circuit including a waveguide disposed on the substrate so that light outputted from the laser is coupled to the waveguide, the circuit further including a clad surrounding the waveguide, with a grating being carved into a portion of the waveguide, the grating reflecting a plurality of light beams of different wavelengths, the Fabry-Perot laser being wavelength-locked by one of the plural reflected light beams;

wherein a wavelength interval between the plurality of longitudinal modes of Fabry-Perot laser and a wavelength interval between the plurality of light beams are different than each other, and operating temperature of the Fabry-Perot laser is controlled for wavelength tuning by wavelength-locking of another one of the plural reflected light beams.

2. (Original) The laser apparatus as set forth in claim 1, wherein the grating is a sampled grating that is fabricated using both a phase mask and an amplitude mask together.

3. (Original) The laser apparatus as set forth in claim 1, wherein the grating is a moiré grating formed by overlapping gratings of different periods.

4. (Original) The laser apparatus as set forth in claim 1, wherein the substrate longitudinally has two ends, the laser being disposed at one of the ends and the circuit being disposed at the other end.

5. (Original) The laser apparatus as set forth in claim 4, wherein the laser is disposed on the substrate in direct light-communicative alignment with the waveguide without any intervening optics.

6. (Original) The laser apparatus as set forth in claim 1, wherein the laser is disposed on the substrate in direct light-communicative alignment with the waveguide without any intervening optics.

7. (Original) The laser apparatus as set forth in claim 1, further comprising a bonding pad formed on the substrate for externally applying a RF signal to the laser.

8. (Original) The laser apparatus as set forth in claim 7, wherein the bonding pad and the laser are wire-bonded to each other through a wire.

9. (Original) The laser apparatus as set forth in claim 8, wherein the grating is a sampled grating that is fabricated using both a phase mask and an amplitude mask together.

10. (Original) The laser apparatus as set forth in claim 8, wherein the grating is a moiré grating formed by overlapping gratings of different periods.

11. (Currently Amended) A method for creating a wavelength-tunable laser apparatus comprising the steps of:

providing a semiconductor substrate;

forming, on the substrate, a Fabry-Perot laser having a plurality of longitudinal modes; and

forming, on the substrate, a planar lightwave circuit including a waveguide disposed on the substrate so that light outputted from the laser is coupled to the waveguide, the circuit further including a clad surrounding the waveguide, with a grating being carved into a portion of the waveguide, the grating reflecting a plurality of light beams of different wavelengths, the Fabry-Perot laser being wavelength-locked by one of the plural reflected light beams;

wherein a wavelength interval between the plurality of longitudinal modes of Fabry-Perot laser and a wavelength interval between the plurality of light beams are different than each other, and operating temperature of the Fabry-Perot laser is controlled for wavelength tuning by wavelength-locking of another one of the plural reflected light beams.

12. (Original) The method as set forth in claim 11, wherein the circuit forming step further comprises the step of using both a phase mask and amplitude mask together in forming said grating as a sampled grating.

13. (Original) The method as set forth in claim 11, wherein the circuit forming step further comprises the step of overlapping gratings of different periods to form said grating as a moiré grating.

14. (Original) The method as set forth in claim 11, wherein the substrate longitudinally has two ends, the laser being disposed at one of the ends and the circuit being disposed at the other end.

15. (Original) The method as set forth in claim 14, wherein the forming steps are performed so that the laser is disposed on the substrate in direct light-communicative alignment with the waveguide without any intervening optics.

16. (Original) The method as set forth in claim 11, wherein the forming steps are performed so that the laser is disposed on the substrate in direct light-communicative alignment with the waveguide without any intervening optics

17. (Original) The method as set forth in claim 11, further comprising the step of forming a bonding pad on the substrate for externally applying a RF signal to the laser.

18. (Original) The method as set forth in claim 17, further comprising the step of using a wire to wire-bond to each other the bonding pad and the laser.

19. (Original) The method as set forth in claim 18, wherein the circuit forming step further comprises the step of using both a phase mask and amplitude mask together in forming said grating as a sampled grating.

20. (Original) The method as set forth in claim 18, wherein the circuit forming step further comprises the step of overlapping gratings of different periods to form said grating as a moiré grating.